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FINAL PHASE 2 RCRA FACILITY INVESTIGATION WORK PLAN FOR AREA OF CONCERN
13 NAS FORT WORTH TX
12/1/2000
HYDROGEOLOGIC



**NAVAL AIR STATION
FORT WORTH JRB
CARSWELL FIELD
TEXAS**

**ADMINISTRATIVE RECORD
COVER SHEET**

AR File Number 657



**FINAL
PHASE II RFI WORK PLAN
AREA OF CONCERN 13
NAS FORT WORTH JRB, TEXAS**



Prepared for

U.S. Air Force Center for Environmental Excellence
Brooks AFB, Texas

Contract Number F41624-95-D-8005

December 2000

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**RESPONSES TO COMMENTS:
DRAFT PHASE II RFI WORK PLAN
AREA OF CONCERN 13
NAS FORT WORTH JRB, TEXAS**

Responses to Comments

Specific Comments

Comment 1 *Page 2-1, Section 2.0: Paragraph 2, third sentence: It is recommended that the text indicates whether analytical samples were collected following the soil excavation. If not, please provide an explanation for not sampling.*

Response HydroGeoLogic was unable to determine whether excavation samples were collected following the removal of the OWS in 1993. Law Environmental began investigating Building 1145 in 1994 and based on those results, further action was necessary. Building 1145 was added to the list of SWMUs/AOCs requiring investigation in March 1995.

Comment 2 *Page 2-4, Section 2.5: First bullet, last sentence: Please include the SPLP results and the new alternative MSC in the final work plan.*

Response HydroGeoLogic has added the requested information.

Comment 3 *Figure 1, Please remove the label for "HydroGeoLogic Field Office" as it does not relate to the project.*

Response HydroGeoLogic concurs and will make the necessary revision.

Comment 4 *Figure 3, Data Screening Values for Groundwater: Please show the actual MQL values in the table.*

Response HydroGeoLogic will attempt to identify the specific MQLs in the RFI Report, however this may be an impossible task since MQLs vary by laboratory, and sometimes by year. These analytical results were generated by a contractor other than HydroGeoLogic.

Comment 5 *Figure 5, Please add "Phase II RFI" to the Figure title.*

Response HydroGeoLogic has made the requested revision.

Comment 6 *Figure 5, Notes, second line: Please insert a space between "detections" and "greater".*

Response HydroGeoLogic has made the requested revision.

Comment 7 *Figure 5, Please add a color-coded legend that indicates previous investigations to include the contractor name and the year samples were collected.*

Response **HydroGeoLogic has made the requested revision.**



FEDERAL EXPRESS

December 4, 2000

Mr. Don Ficklen
HQ AFCEE/ERD
3207 North Road
Brooks AFB, Texas 78235-5363

**Re: Final Phase II RFI Work Plan
Area of Concern 13
NAS Fort Worth JRB, Texas
F41624-95-D-8005-0016**

Dear Mr. Ficklen:

HydroGeoLogic, Inc. is pleased to submit the Final version of the Phase II RFI Work Plan and for the Area of Concern 13 at NAS Fort Worth JRB, Texas. This report summarizes historical and existing site data, identifies data gaps, and proposes soil and groundwater investigation activities designed to provide the information necessary to determine the appropriate closure standard and complete the AOC 13 RFI Report. Field work is expected to commence the week of December 11, 2000.

Please call me at (512) 336-1170 should you have any questions or comments concerning this document.

Sincerely,

A handwritten signature in black ink, appearing to read "Todd Harrah", written in a cursive style.

Todd Harrah
Project Manager

Enclosure

cc: Michael Dodyk (AFCEE/ERD)
Audrie Medina (UNITEC Inc.)

**FINAL
PHASE II RFI WORK PLAN
AREA OF CONCERN 13
NAS FORT WORTH JRB, TEXAS**

Prepared for

U.S. Air Force Center for Environmental Excellence
Brooks AFB, Texas

Contract No. F41624-95-D-8005

Prepared by

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December 2000

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13 ABSTRACT (Maximum 200 words) This document presents the Final Phase II RFI Work Plan for Area of Concern 13 (AOC 13), i.e., the Building 1145 Oil/Water Separator (OWS), at the Naval Air Station Fort Worth Joint Reserve Base, Texas. Evaluation of both historical site characterization data and data collected during the recent removal of the OWS and associated underground storage tank, indicates that sufficient information does not currently exist to support a determination of the appropriate site closure standard under the Texas Natural Resource Conservation Commission Risk Reduction Rules Program. This Work Plan summarizes existing site data, identifies data gaps, and proposes soil and groundwater investigation activities designed to provide the information necessary to determine the appropriate closure standard and complete the AOC 13 RFI Report. Proposed investigation activities include confirmation sampling of constituents previously detected in soil and groundwater, performance of the synthetic precipitation leachate procedure (SPLP) to evaluate leaching characteristics of soil contaminants, and soil and groundwater sampling to delineate site contaminants to background concentrations. This Work Plan proposes the performance of one round of soil and groundwater sampling. If analytical results indicate that additional sampling is necessary, additional sampling requirements will be proposed as an addendum to this Final Phase II Work Plan.				
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PREFACE

This Final Phase II Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for Area of Concern (AOC) 13 was prepared for the U.S. Air Force Center for Environmental Excellence (AFCEE) to propose additional soil and groundwater sampling and analysis necessary to complete the environmental investigation and determine the appropriate closure standard for the site under the Texas Natural Resource Conservation Commission (TNRCC) Risk Reduction Rules Program. The site is located at the Naval Air Station Fort Worth Joint Reserve Base (NAS Fort Worth JRB), Texas. The site characterization data proposed to be collected in this Work Plan will support the completion of the RFI Report, including a request for closure of the site from the TNRCC. In order to provide the rationale for proposed sampling and analysis, this Work Plan also presents a summary of existing site characterization data for AOC 13. This includes a summary of data resulting from excavation and confirmation sampling activities associated with the removal and replacement of the previous OWS and UST, as well as data resulting from previous environmental investigations. The proposed actions contained in this Work Plan are designed to determine the complete nature and extent of any remaining contamination in site soils and groundwater.

The work is being conducted under Contract No. F41624-95-D-8005, Delivery Order No. 0016 issued to HydroGeoLogic, Inc. (HydroGeoLogic) in support of the Air Force Installation Restoration Program (IRP). HydroGeoLogic's Program Manager is Mr. James P. Costello, P.G. HydroGeoLogic's Project Manager is Mr. Todd C. Harrah.

This contract is administered by the Defense Contract Management Command, 10500 Battleview Parkway, Suite 200, Manassas, Virginia, 22110. The Contracting Officer is Mr. Cliff Trimble. The Contracting Officer's Representative is Mr. Don Ficklen, located at Headquarters AFCEE/Environmental Restoration Division, 3207 North Road, Brooks Air Force Base (AFB), Texas 78235-5363.

Investigation activities performed to date by HydroGeoLogic, as well as those proposed herein, are performed in accordance with the procedures provided in HydroGeoLogic's Revised Final Work Plans RFI of Waste Accumulation Areas (HydroGeoLogic, 1999), the Final Basewide Quality Assurance Project Plan (QAPP) (HydroGeoLogic, 2000), and AFCEE-approved modifications.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFCEE	U.S. Air Force Center for Environmental Excellence
AOC	area of concern
AFB	Air Force Base
bgs	below ground surface
CFR	Code of Federal Regulations
COC	contaminant of concern
GSAP	Groundwater Sampling and Analysis Program
HW	hazardous waste
HydroGeoLogic	HydroGeoLogic, Inc.
IRP	Installation Restoration Program
IT	IT Corporation
LAW	Law Engineering and Environmental Services, Inc.
LNAPL	light non-aqueous phase liquid
mg/kg	milligram per kilogram
MQL	method quantitation limit
MSC	medium-specific concentration
NAS Fort Worth JRB	Naval Air Station Fort Worth Joint Reserve Base
OWS	oil/water separator
PCB	polychlorinated biphenyl
POL	petroleum, oil, and lubricants
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RRS	Risk Reduction Standard
SPLP	Synthetic Precipitation Leaching Procedure
Sunbelt	Sunbelt Industrial Services, Inc.
SVOC	semivolatile organic compound
SWMU	solid waste management unit

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

TAL	Target Analyte List
TNRCC	Texas Natural Resource Conservation Commission
TOC	total organic carbon
$\mu\text{g/L}$	microgram per liter
UST	underground storage tank
VOC	volatile organic compound
WAA	waste accumulation area
WP	work plan

**FINAL
PHASE II RFI WORK PLAN
AREA OF CONCERN 13
NAS FORT WORTH JRB, TEXAS**

1.0 PROJECT BACKGROUND

On February 7, 1991, the former Carswell Air Force Base (AFB), now Naval Air Station Fort Worth Joint Reserve Base (NAS Fort Worth JRB), was issued a Resource Conservation and Recovery Act (RCRA) hazardous waste (HW) permit HW-50289 by the Texas Natural Resource Conservation Commission (TNRCC). This permit requires a RCRA Facility Investigation (RFI) of all Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) listed in Permit Provision VIII; as well as those SWMUs and AOCs subsequently added to the list. On March 2, 1995 AOC 13, the Auto Hobby Shop oil/water separator (OWS) and associated underground storage tank (UST) was added to Permit Provision VIII. The permit requires that the owner determine whether hazardous constituents listed in the 40 Code of Federal Regulations (CFR) Part 264, Appendix IX have been released into the environment prior to site closure and removal of the SWMU or AOC from the permit.

AOC 13, the Auto Hobby Shop (Building 1145), was constructed in September 1989. Building 1145 is located south of the petroleum oil and lubricant (POL) tank farm on Hobby Shop Road (Figure 1). The OWS and associated UST was located under the concrete pavement adjacent to the back of the building and received waste engine oil, lubricating oil, brake fluid, grease, and other petroleum by-products. The majority of historical contaminant releases at AOC 13 have occurred as a result of leaking connection pipes leading from the Auto Hobby Shop to the OWS. This document provides a summary of all environmental investigation and construction activities previously conducted at AOC 13 and proposes additional soil and groundwater investigation needed to confirm and/or delineate contaminants previously detected at the site. Proposed investigations are designed to the complete nature and extent of any remaining contamination in site soils and groundwater and support the completion of an RFI Report and request for site closure.

Whereas significant site investigation work has been performed at this site over a number of years, the work proposed in this Work Plan represents an iterative step of the investigation process to confirm and/or delineate previously detected contaminants. As such, this Work Plan is condensed and only presents proposed sampling and analysis and the historical information relevant to providing a rationale for proposed work. In order to supplement this abbreviated Work Plan, investigation activities proposed are also to be performed in accordance with the field sampling and health and safety procedures presented in HydroGeoLogic's Revised Final Work Plans RFI of Waste Accumulation Areas (HydroGeoLogic, 1999), the Final Basewide Quality Assurance Project Plan (QAPP) (HydroGeoLogic, 2000), and AFCEE-approved modifications.

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2.0 PREVIOUS INVESTIGATIONS

The original OWS was installed in 1982 to treat wastewater collected from the Auto Hobby Shop floor drains located within Building 1140. The OWS was connected to a double-walled UST (1145-1) and the effluent water was then piped to the sanitary sewer (IT, 1998). A new Auto Hobby Shop (Building 1145) was built in September 1989, and the OWS and UST (1145-1) were relocated and placed south of Building 1145. Two additional USTs (1140-1 and 1140-2), located to the east (down gradient) of the Building 1145, were punctured during construction activities of Building 1145, and were subsequently removed. Clean closure is currently being submitted to the TNRCC for USTs 1140-1 and 1140-2 under a separate project.

A broken inflow pipe was discovered in 1993 during the replacement of the original OWS. Soil beneath the OWS was saturated with light non-aqueous phase liquid (LNAPL). The contaminated soil was over excavated, replaced with clean fill, and a new OWS was installed. The original UST (1145-1) was not removed during this excavation. The excavated area was capped with 8 inches of reinforced concrete, thereby limiting surface water from leaching through site soils and further transporting contaminants to groundwater.

2.1 LAW ENGINEERING AND ENVIRONMENTAL SERVICES - 1994

In April 1994, Law Engineering and Environmental Services (LAW) conducted a RCRA Facility Assessment (RFA) on 11 OWSs located at the former Carswell AFB. The Auto Hobby Shop, Building 1145 was part of this RFA. The RFA was designed to evaluate the operational status of the OWS, assess the potential for release of contaminants, recommend repairs or replacement, and provide recommendations concerning the future use of each OWS (LAW, 1995). LAW advanced four soil borings (1145-SB01 through 1145-SB04) surrounding the OWS. Surface and subsurface soil samples were collected at each boring and analyzed for volatile organic compounds (VOCs) and metals by EPA Methods SW8240 and SW6010, respectively. Soil borings were located on the northeast, southeast, southwest, and northwest side of the OWS. The locations of these borings and analytical results exceeding RRS 1 are depicted in Figure 2.

- Analytical results indicated surface and subsurface detections of metals (arsenic and cadmium) slightly above RRS 2. Concentrations of arsenic included a detection of 9.4 milligram per kilogram (mg/kg) in boring 1145-SB02 (6-8') and 17 mg/kg in boring 1145-SB03 (surface). The RRS 2 for arsenic is 5.85 mg/kg in surface soil and 6.58 in subsurface soil. Detections of cadmium in surface soil samples ranged from 2.1 to 2.7 mg/kg, and in subsurface soils from 2.0 to 3.2 mg/kg. The RRS 2 for cadmium is 0.556 mg/kg in surface soil and 0.59 in subsurface soil.
- Analytical results indicated surface and subsurface detections of several VOCs exceeding RRS 1. Detected VOCs included acetone, methylene chloride, ethylbenzene, and total xylenes. LAW identified detections of acetone and methylene chloride as laboratory artifacts. There were no detections of VOCs greater than RRS 2.

2.2 IT CORPORATION - 1997

In 1997, IT Corporation (IT) performed a RCRA Facility Investigation (RFI) of the Sanitary Sewer System to investigate the potential for a release of hazardous materials into the environment and assess the potential impact on human health and the environment. IT advanced two soil borings (SB114501 and SB114502) on either side of the OWS (IT, 1997) (Figure 2). Soil samples were collected in the subsurface and analyzed for semivolatile organic compounds (SVOCs) and organochlorine pesticides/polychlorinated biphenyls (pesticides/PCBs) by EPA Methods SW8270 and SW8080, respectively. In addition, monitoring well WITCTA036 was installed after over drilling soil boring SB114501. Approximately 2 feet of LNAPL was extracted from WITCTA036 just after the well was installed. IT continued to perform product removal at WITCTA036 and recommended additional delineation of contaminants detected in soil (IT, 1997).

- No surface samples were collected, however, analytical results for subsurface samples indicated the presence of several SVOCs at concentrations above RRS 1. One SVOC, bis (2-ethylhexyl) phalate, was detected at concentrations above RRS 2 at two sampling locations. Bis (2-ethylhexyl) phalate was detected at boring SB114501 (13-15'), at a concentration of 2.6 mg/kg, and at SB114502 (13-15') at a concentration of 2.7 J mg/kg. The RRS 2 concentration for bis (2-ethylhexyl) phalate is 0.6 mg/kg. There were no detections of pesticides/PCBs above RRS 1.
- Groundwater samples were collected from WITCTA036 and analyzed for VOCs (SW8260), SVOCs (SW8270), metals/mercury (SW6010/SW7000/SW7471), and diesel/gasoline range organics (SW8015). The location of well WITCTA036 and analytical results of sampling are depicted in Figure 3. No metals were detected above RRS 1 in the groundwater sample. Diesel and gasoline range organics were detected at concentrations significantly above RRS 1; however, the TNRCC does not have established medium-specific concentrations (MSCs), or RRS 2 values, for these organic ranges. Several VOCs and SVOCs were detected at concentrations significantly higher than the RRS 2 concentrations. The elevated dissolved concentrations of VOCs and SVOCs were consistent with the finding of LNAPL in the well.

2.3 IT CORPORATION - 1998

In January 1998, IT conducted a second round of sampling, installing five additional soil borings (SB114503, SB114504, SB114506, SB114507, and SB114508) to determine the extent of petroleum contamination in soils and whether free product detected at well WITCTA036 was migrating laterally in groundwater (IT, 1998). Surface and subsurface soil samples were collected and analyzed for VOCs (SW8260), SVOCs (SW8270), pesticides/PCBs (SW8080), and metals/mercury (SW6010/SW7000/SW7471) (Figure 2). In addition, IT installed 13 stratopunch groundwater screening wells to determine the lateral migration of constituents in groundwater. These screening wells were field analyzed for VOCs by EPA Method SW8021. Based upon the screening results, five permanent monitoring wells (WITCTA040 through WITCTA044) were installed and developed. These five monitoring wells were sampled for VOCs (SW8260), SVOCs (SW8270), and metals/mercury (SW6010/SW7000/SW7471). Figure 3 provides groundwater analytical results exceeding RRS 1 and RRS 2 values. IT continued product removal until March 1998, at which time HydroGeoLogic continued the free product removal on a weekly basis.

- Analytical results from soil samples indicated the presence of some metals above RRS 2. Cadmium was detected at a concentration of 0.95 at SB114507 (surface). The RRS 2 value for cadmium in surface soil is 0.556 mg/kg. There were two detections of antimony above RRS 2. They included a concentration of 0.64 F at SB114507 (surface) and 0.69 F at SB114504 (surface). The RRS 2 value for antimony in surface soil is 0.56 mg/kg. The only other detection of an inorganic compound was lead at a concentration of 159 mg/kg at the surface interval of SB114507. The RRS 2 concentration for lead in surface soil is 30.97 mg/kg.
- Analytical results from soil samples indicated the presence of several VOCs and one SVOC in site soils at concentrations above RRS 1. Most of the detections were limited to boring SB114503 and were all below respective RRS 2 values. Detections of methylene chloride at several locations and intervals were qualified as laboratory artifacts by IT. There were no detections of pesticides/PCBs. See Figure 2 for soil analytical results.
- Analytical results from groundwater sampling indicated that groundwater contamination resulting from OWS releases were localized to the area in the immediate vicinity of the OWS (Figure 3). Detections of petroleum related VOCs were limited to the sample collected from well WITCTA041 and were all below RRS 2 values. Only two VOCs were detected above their respective RRS 2 values. Trichloroethene (TCE) was detected at a concentration of 25 micrograms per liter (µg/L) in the sample collected from background well WITCTA040, and vinyl chloride was detected at a concentration of 2.1 µg/L in the sample collected from well WITCTA041. Both of these detections are associated with a regional TCE groundwater plume being addressed under a separate project. No other organics or inorganics were detected above RRS 2 values.

2.4 HYDROGEOLOGIC INC. - 1999

HydroGeoLogic performed quarterly groundwater monitoring in 1999 on two of the five AOC 13 monitoring wells. During January, July, and October 1999, monitoring well WITCTA044 was sampled and analyzed for VOCs (SW8260B) and natural attenuation parameters (i.e., chloride; nitrate; sulfate; total organic carbon (TOC); iron II; alkalinity; and methane, ethene, and ethane). In April 1999, monitoring well WITCTA041 was sampled and analyzed for VOCs by EPA Method SW8260B and metals/mercury by EPA Methods SW6010B/SW7000 and SW7471.

Free product recovery was performed in January and July 1998 at WITCTA036, at which time free product thickness was greater than 2 feet in each event. In August 1998, HydroGeoLogic began weekly product removal from WITCTA036. The thickness of product removed during weekly removal activities has generally ranged between 0.6 and 0.8 feet in thickness up to just before May 2000 excavation activities.

- Analytical results for groundwater indicated no detections of VOCs during four quarters of 1999 quarterly groundwater sampling at monitoring well WITCTA044, and no detections of VOCs during the April 1999 sampling event at well WITCTA041. All metals concentrations were below background during the April 1999 sampling event at well WITCTA041.

2.5 HYDROGEOLOGIC INC. - 2000

In May and June 2000, HydroGeoLogic completed the removal and disposal of the Building 1145 OWS, UST, and associated contaminated media. The excavation consisted of removing the surface concrete, subsurface soils, and OWS/UST system. Approximately 300 cubic yards of soil were removed and the excavation area measured approximately 16.5 feet wide by 32 feet long and 16 feet deep. Monitoring well WITCTA036 was within the excavation area and was plugged and abandoned. Groundwater was encountered during the excavation at 16 feet below ground surface (bgs) and a small amount of LNAPL was observed on the groundwater. Groundwater from the excavation was repeatedly pumped out, allowing the pit allowed to recharge between pumping events, in an effort to remove as much free product as possible. Approximately 2,600 gallons of free product-impacted water was removed from the excavation area and appropriately disposed. Following the excavation and removal of contaminated groundwater, 10 confirmation samples were collected from the sidewalls/perimeter of the excavation area in order to determine the amount, if any, residual contamination left in place (Figure 4). The new 1,500-gallon OWS system was installed and the excavation was back filled with crushed stone. The new OWS is a self-contained unit and therefore, a new UST was not installed.

Table 1 provides the depth and location of each confirmation sample collected. Samples PHGL1145-E1 and PHGL1145-E4 were collected on the same sidewall at different depths, and samples PHGL1145-E2 and PHGL1145-E3 were also collected at the same location at different depths. Soil samples were analyzed for VOCs (SW8260), SVOCs (SW8270), metals/mercury (SW6010/SW7000/SW7471), and total petroleum hydrocarbons (TPH) by Texas Method TX1005.

- Analytical results from soil samples indicated the presence of only one metal above RRS 2. Chromium was detected in five samples ranging in concentration from 16.7 to 18.9 mg/kg. The surface and subsurface RRS 2 concentration for chromium is 16.31 mg/kg. The highest detection of chromium at PHGL1145-W2 (18.9 mg/kg), was submitted for SPLP analysis and was determined not to exceed the groundwater MSC for chromium (0.1 mg/L). Therefore, the site-specific MSC for chromium in soil is 18.9 mg/kg.
- Analytical results from soil samples indicated the presence of several VOCs and SVOCs above RRS 1 concentrations. Detected VOCs and SVOCs were limited to the subsurface soil in the northeast quadrant of the site (samples PHGL1145-E4 and PHGL1145-N1). However, all of these detections were below respective RRS 2 concentrations. Total petroleum hydrocarbons were not detected in any soil samples.

Table 1
Excavation Confirmation Sample Information
HydroGeoLogic - May 2000

Sample ID	Depth (ft)	Location of Sample Taken Within Excavation	TPC (mg/L)
PHGL1145-E1	10	4' South from NE corner	0.0
PHGL1145-E2	10	15' South from NE corner	0.0
PHGL1145-E3	14	15' South from NE corner	0.0
PHGL1145-E4	14	4' South from NE corner	64.2
PHGL1145-E5	10	21' South from NE corner	0.0
PHGL1145-N1	10	5' West from NE corner	87.0
PHGL1145-S1	10	5' West from SE corner	0.0
PHGL1145-W1	8.5	6' South from NW corner	0.0
PHGL1145-W2	10	16' South from NW corner	0.0
PHGL1145-W3	10	20' South from NW corner	0.0

Notes:

NE - northeast

NW - northwest

SE - southeast

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3.0 CURRENT INVESTIGATION

The May 2000 excavation confirmation sampling results were evaluated in comparison with historical site characterization data. It was concluded that data gaps in soil and groundwater remain, and that additional investigation is necessary to acquire sufficient site characterization data to determine the appropriate closure standard for the site under the TNRCC RRS program.

Additional soil borings will be installed in order to confirm and/or delineate previously detected site contaminants (Figure 5). In general, if compounds are detected in soil above the RRS 2 concentration, the highest detections of the compound will be subjected to SPLP testing to attempt to establish a site-specific MSC.

It is proposed that five soil borings be advanced in order to confirm and/or delineate previous constituent detections at AOC 13 to background values. Figure 5 illustrates the proposed sampling locations and analytical parameters.

- Soil boring BHGLAOC13001 and BHGLAOC13002 will be advanced southeast of 1145-SB02 and east of 1145-SB03, respectively in order to confirm Standard 3 surface and subsurface soil concentrations of arsenic and cadmium detected by LAW in 1994.
- Soil boring BHGLAOC13003 will be advanced just southeast of SB114507 in order to confirm Standard 3 surface soil concentrations of cadmium and lead detected by IT in 1998.
- Soil boring BHGLAOC13004 will be advanced south of the excavation area in order to delineate surface soil Standard 3 concentrations of arsenic, cadmium, and lead and Standard 2 concentrations zinc detected at 1145-SB03 (LAW) and SB114507 (IT). Boring BHGLAOC13004 will also be used to delineate subsurface Standard 3 concentrations of cadmium detected at 1145-SB03 (LAW) and 1145-SB04 (LAW).
- Soil boring BHGLAOC13005 will be completed west of the excavation area and between 1145-SB01 and 1145-SB04 to delineate Standard 3 concentrations of cadmium and chromium, and RRS 2 concentrations of VOCs and SVOCs that were detected at the surrounding east, north, and south soil borings and excavation samples. This boring will also provide western delineation for RRS 3 concentrations of cadmium and chromium detected at the surface, 5-, and 10-foot intervals at boring 1145-SB04 (IT) and 1145-SB01 (IT).

During this second phase of the RFI field effort, a portion of the soil sample volume submitted with each metals analyses, will be held at the laboratory to be utilized for possible SPLP analysis. Where holding times allow, the SPLP extraction method will be used to determine if a higher site-specific MSC value can be established for all inorganic and organic compounds detected above the promulgated RRS 2. All SPLP extraction results will be compared to the industrial groundwater MSCs.

In addition to soil sampling, one round of groundwater sampling is necessary to determine if groundwater contamination has been effectively delineated. Table 2 provides the proposed groundwater sampling locations and analytical parameters.

Table 2
Proposed Groundwater Sample Locations and Parameters

Sample Location	Sample Parameters		
	VOCs	Semi-VOCs	Metals
WITCTA040	x	x	x
WITCTA041	x	x	x
WITCTA042	x	x	x
WITCTA043	x	x	x
WITCTA044			x

*One round of groundwater sampling will be performed.

Once the proposed field effort is complete, the results will be evaluated to determine if the data adequately defines the nature and extent of all site contaminants. If not, HydroGeoLogic will prepare a letter proposal for submission and approval by the AFCEE to complete required sampling and analysis. Once the nature and extent have been fully defined, the results will be compiled and presented in an RFI Report, with a discussion of the RRS that is appropriate for closure at this site.

4.0 REFERENCES

HydroGeoLogic, Inc., 1999, Revised Final Work Plans, RCRA Facility Investigation of Waste Waste Accumulation Areas, NAS Fort Worth JRB, Texas.

HydroGeoLogic, 2000, Final 2000 Basewide Quality Assurance Project Plan (QAPP), NAS Fort Worth JRB, Texas.

IT Corporation, 1997, Draft Naval Air Station Fort Worth RCRA Facility Investigation (RFI) Sanitary Sewer System, NAS Fort Worth JRB, Texas.

IT Corporation, 1998, Draft Naval Air Station Fort Worth OWS RCRA Facility Investigation Addendum Report, NAS Fort Worth JRB, Texas.

Law Engineering and Environmental Services, 1995, Final Installation Restoration Program (IRP) Oil/Water Separator Assessment Report, NAS Fort Worth JRB, Texas.

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FIGURES

HydroGeoLogic, Inc. —Final Phase II RFI Work Plan
NAS Fort Worth JRB, Texas

Figure 1

Site Map
NAS Fort Worth JRB, Texas



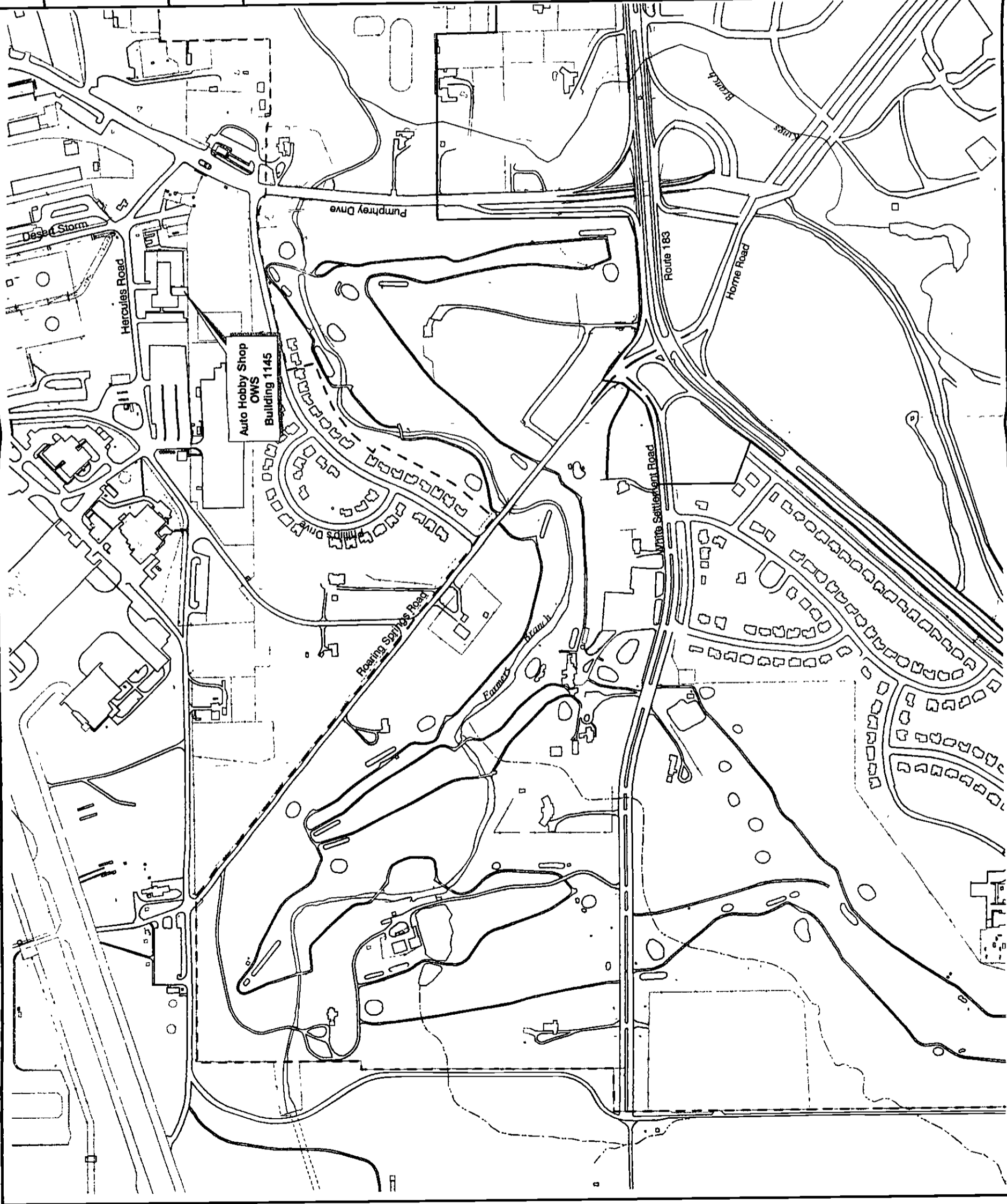
U.S. Air Force Center for
Environmental Excellence

Legend

- NAS Fort Worth JRB (Carswell Field)
- Former Carswell Air Force Base



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Project AFC001-16DC
Created 09/13/00 jbc/cher
Revised 12/04/00 cf
Map Source: HydroGeoLogic, Inc
GIS Database



HydroGeoLogic, Inc.—Final Phase II RFI Work Plan
NAS Fort Worth JRB, Texas

Figure 2

Historical Detections
Above RRS 1 in Soil
1994-1998



U.S. Air Force Center for
Environmental Excellence

Legend

- Fence
- Building / Structure
- Groundwater Flow Direction
- Existing Monitoring Well Location
- WTCTA042

Soil Borings

- SB114503 Law Engineering - 1994 *
- SB114503 IT Corporation - 1997
- SB114503 IT Corporation - 1998 *

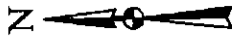
* Survey data are unavailable and
soil boring locations are approximations.



Analyte detected above RRS 2.

Field Investigations

- Law Engineering 1994 Results
- IT Corporation 1997 Results
- IT Corporation 1998 Results



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Project AFC001-16DC
Created 04/15/99 jbelcher
Revised 12/01/00 cf
Map Source: HydroGeoLogic, Inc
GIS Database



Data Screening Values for Inorganic Constituents in Soil

Method	Analyte	Surface RRS-1	Surface RRS-2	Subsurface RRS-1	Subsurface RRS-2
SW6010	Antimony	0.56	0.6	0.712	0.712
SW6010	Arsenic	5.83	5.83	6.58	6.58
SW6010	Cadmium	0.556	0.556	0.59	0.59
SW6010	Calcium	167788	NV	272000	NV
SW6010	Lead	30.97	30.97	12.66	12.66
SW6010	Selenium	0.907	5	0.313	5
SW6010	Zinc	38.8	3100	31.3	3100

Data Screening Values for Organic Compounds in Soil

Method	Analyte	RRS-1	RRS-2
SW8260	1,3,5-Trimethylbenzene	MQI*	NV
SW8240	Acetone	MQI*	1000
SW8240	Ethylbenzene	MQI*	70
SW8260	Isopropylbenzene	MQI*	70
SW8260	m,p-Xylene	MQI*	1000
SW8240	Methylene Chloride	MQI*	0.5
SW8260	n-Butylbenzene	MQI*	0.5
SW8260	n-Propylbenzene	MQI*	NV
SW8240	Xylenes, Total	MQI*	1000
SW8270	1,3-Dimethylbenzene	MQI*	NV
SW8270	1,4-Dimethylbenzene	MQI*	NV
SW8270	1-Methylbenzene	MQI*	NV
SW8270	1-Propenylbenzene	MQI*	NV
SW8270	2,6-Dimethylbenzene	MQI*	NV
SW8270	2-Methylbenzene	MQI*	410
SW8270	Bis(2-Ethylhexyl)phthalate	MQI*	0.6
SW8270	Naphthalene	MQI*	200

* MQI is from historical data and was not provided

Building 1145

Method	Compound	Result
SW8080	Pesticides/PCBs	13-15'
SW8270	1,3-Dimethylbenzene	2.28 J
SW8270	1-Methylbenzene	2.52 J
SW8270	Bis(2-Ethylhexyl)phthalate	2.7 J
SW8270	Naphthalene	3.2 J

1145-SB02

Method	Analyte	Result
SW6010	Arsenic	6-8'
SW6010	Cadmium	9.4
SW8240	Acetone	2.7
SW8240	Ethylbenzene	0.03
SW8240	Methylene Chloride	0.017
SW8240	Xylenes, Total	0.045

1145-SB01

Method	Analyte	Result
SW6010	Cadmium	7-9'
SW8240	Methylene Chloride	2.1
SW8240	Xylenes, Total	2.0
SW8240	Xylenes, Total	0.016
SW8240	Xylenes, Total	0.014
SW8240	Xylenes, Total	0.049

1145-SB04

Method	Analyte	Result
SW6010	Cadmium	2.3 J
SW8240	Methylene Chloride	0.014
SW8240	Methylene Chloride	0.015

Method	Analyte	Result
SW6010	Metals	13-14'
SW8080	Pesticides/PCBs	
SW8260	Methylene Chloride	0.0042
SW8270	Semivolatiles	0.0043

1145-SB03

Method	Analyte	Result
SW6010	Arsenic	17
SW6010	Cadmium	2.3
SW6010	Calcium	310000 JH
SW8240	Acetone	0.073
SW8240	Methylene Chloride	0.017
SW8240	Methylene Chloride	0.015

1145-SB05

Method	Analyte	Result
SW6010	Antimony	0.64 F
SW6010	Cadmium	0.95
SW6010	Lead	159
SW6010	Zinc	76.6
SW8080	Pesticides/PCBs	15.3
SW8260	Methylene Chloride	0.007
SW8270	Semivolatiles	0.0055

1145-SB06

Method	Analyte	Result
SW6010	Selenium	Surface
SW8080	Pesticides/PCBs	0.38 F
SW8260	Methylene Chloride	0.0044
SW8270	Semivolatiles	0.0042

1145-SB07

1145-SB08

1145-SB09

1145-SB10

1145-SB11

1145-SB12

1145-SB13

1145-SB14

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1145-SB191

1145-SB192

1145-SB193

1145-SB194

1145-SB195

1145-SB196

1145-SB197

1145-SB198

1145-SB199

Figure 3

Groundwater Detections
Above RRS 1
1997-1999



U.S. Air Force Center for
Environmental Excellence

Legend

- Fence
- Building / Structure
- Groundwater Flow Direction
- Existing Monitoring Well Location
- WITCTA042

Soil Borings

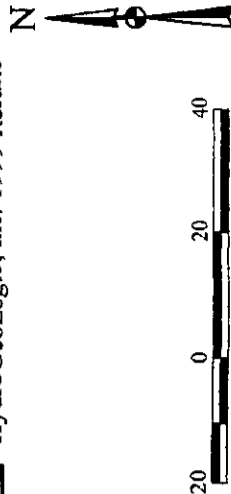
- SB114503 Law Engineering - 1994 *
- SB114503 IT Corporation - 1997
- SB114503 IT Corporation - 1998*

* Survey data are unavailable and
soil boring locations are approximations.

Analyte detected above RRS 2

Field Investigations

- IT Corporation - 1997 Results
- IT Corporation - 1998 Results
- HydroGeoLogic, Inc. 1999 Results



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Project AFC001-16DC
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Revised 12/01/00 of
Map Source HydroGeoLogic, Inc
GIS Database



Data Screening Values for Groundwater

Method	Analyte	RRS-1	RRS-2
M8015D	Gasoline Range Organics	MQL*	NV
SW6010	Chromium	MQL*	NV
SW6010	Cobalt	6	100
SW6010	Copper	8.9	6100
SW6010	Iron	2.8	1300
SW6010	Lead	224	NV
SW8260	1,1-Dichloroethane	MQL*	10000
SW8260	1,1,1-Trichloroethane	MQL*	NV
SW8260	1,2,4-Trimethylbenzene	MQL*	NV
SW8260	1,2-Dichlorobenzene	MQL*	600
SW8260	1,3,5-Trimethylbenzene	MQL*	NV
SW8260	1-Methyl-2-Propylbenzene	MQL*	NV
SW8260	Benzene	MQL*	5
SW8260	cis-1,2-Dichloroethene	MQL*	70
SW8260	Ethylbenzene	MQL*	700
SW8260	m,p-Xylene	MQL*	10000
SW8260	Methylene Chloride	MQL*	5
SW8260	Naphthalene	MQL*	2000
SW8260	n-Propylbenzene	MQL*	NV
SW8260	o-Xylene (1,2-dimethylbenzene)	MQL*	10000
SW8260	Toluene	MQL*	1000
SW8260	Trichloroethene (TCE)	MQL*	5
SW8260	Vinyl Chloride	MQL*	2
SW8270	2-Methylnaphthalene	MQL*	4100
SW8270	Naphthalene	MQL*	2000

* MQL is from historical data, the MQL value was not provided

WITCTA041

Method	Analyte	Result	Result
SW6010	Chromium	6.4 F	ND
SW6010	Cobalt	14	ND
SW6010	Copper	6.6 F	ND
SW6010	Iron	1130	ND
SW8260	1,1-Dichloroethane	9.5	ND
SW8260	1,2,4-Trimethylbenzene	3.7	ND
SW8260	1,2-Dichlorobenzene	0.39	ND
SW8260	1,3,5-Trimethylbenzene	1.6	ND
SW8260	Benzene	3.3	ND
SW8260	Ethylbenzene	3.4	ND
SW8260	Methylene Chloride	0.36	ND
SW8260	Naphthalene	3.3	ND
SW8260	n-Propylbenzene	0.94	ND
SW8260	o-Xylene (1,2-dimethylbenzene)	3.9	ND
SW8260	Toluene	3.7	ND
SW8260	Trichloroethene (TCE)	0.33 J	ND
SW8260	Vinyl Chloride	2.1	ND
SW8270	Semivolatiles		NA

WITCTA043

Method	Analyte	Result
SW6010	Copper	3.6 F
SW6010	Iron	420
SW8260	Volatiles	
SW8270	Semivolatiles	

WITCTA044

Method	Analyte	Result	Result
SW6010	Chromium	13.8	NA
SW6010	Copper	3.4 F	NA
SW6010	Iron	828	NA
SW8260	Volatiles		NA
SW8270	Semivolatiles		NA

WITCTA036

Method	Compound	Result
SW6010	Metals	
M8015D	Direct Range Organics	11000
M8015V	Gasoline Range Organics	8600
SW8260	1,1,1-Trichloroethane	28000 J
SW8260	1,2,4-Trimethylbenzene	75000 J
SW8260	1,3,5-Trimethylbenzene	190000
SW8260	1-Methyl-2-Propylbenzene	300000
SW8260	Ethylbenzene	120000
SW8260	m,p-Xylene	410000
SW8260	Naphthalene	320000
SW8260	n-Propylbenzene	94000
SW8260	o-Xylene (1,2-dimethylbenzene)	230000
SW8260	Toluene	180000
SW8270	2-Methylnaphthalene	700000
SW8270	Naphthalene	320000

WITCTA040

Method	Analyte	Result
SW6010	Metals	
SW8260	cis-1,2-Dichloroethene	5.1
SW8260	Trichloroethene (TCE)	25
SW8270	Semivolatiles	

Building 1145

WITCTA042

Method	Analyte	Result
SW6010	Iron	1980
SW8260	Volatiles	
SW8270	Semivolatiles	

WITCTA042

Notes:
Concentrations are reported in µg/L
NV - No Value
ND - Non-detect
NA - Not Analyzed
MQL - Method Quantitation Limit
RRS 1 - Risk Reduction Standard 1
RRS 2 - Risk Reduction Standard 2
F - The analyte was positively identified but the associated numerical value is below the MQL
J - Estimated quantitation based upon the QC data
"Blank Spaces" - Analyte not detected above RRS 1

Figure 4

May 2000 OWS and
UST Excavation Soil Detections
Above RRS 1



U.S. Air Force Center for
Environmental Excellence

Legend

- Fence
- Building / Structure
- Groundwater Flow Direction
- Existing Monitoring Well Location
WITCTA042
- Former Monitoring Well Location
WITCTA036
- Excavation Area

Soil Borings

- SB114503 Law Engineering - 1994 *
- SB114503 IT Corporation - 1997
- SB114503 IT Corporation - 1998 *
- PHGL1145-E1 HGL Soil Samples - 2000

* Survey data are unavailable and
soil boring locations are approximations.

Analyte detected above RRS 2.

HydroGeoLogic May 2000 Results



Filename: X:\4600\116DB\Phase II RFI WP\Report1

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Project: AFC001-16DC

Created: 04/15/99 jbelcher

Revised: 12/01/00 of

Map Source: HydroGeoLogic, Inc

GIS Database

WITCTA044

Data Screening Values for Soil			
Method	Analyte	Subsurface RRS-1	Subsurface RRS-2
SW6010	Chromium, Total	16.31	16.31
SW6010	Zinc	31.3	3100
SW8260B	Acetone	0.02	1000
SW8260B	Benzene	0.002	0.5
SW8260B	Ethylbenzene	0.003	70
SW8260B	m,p-Xylene	0.007	1000
SW8260B	Methyl Ethyl Ketone (2-Butanone)	0.02	6100
SW8260B	o-Xylene (1,2-Dimethylbenzene)	0.005	1000
SW8260B	Toluene	0.005	100
SW8270C	2-Methylnaphthalene	0.7	410
SW8270C	Naphthalene	0.7	200

PHGL1145-E1		
Method	Analyte	Result 8.5-11.5'
SW6010B	Total Metals	
SW8260B	Acetone	0.046
TX1005	Total Petroleum Hydrocarbons	

PHGL1145-E4		
Method	Analyte	Result 12.5-15.5'
SW6010	Chromium, Total	17.9
SW6010	Zinc	33.9
SW8260B	Acetone	0.22
SW8260B	Benzene	0.004
SW8260B	Ethylbenzene	0.067
SW8260B	m,p-Xylene	0.14
SW8260B	Methyl Ethyl Ketone (2-Butanone)	0.023
SW8260B	o-Xylene (1,2-Dimethylbenzene)	0.091
SW8260B	Toluene	0.009
SW8270C	2-Methylnaphthalene	2
SW8270C	Naphthalene	0.89
TX1005	Total Petroleum Hydrocarbons	

PHGL1145-E2		
Method	Analyte	Result 8.5-11.5'
SW6010	Chromium, Total	16.7
SW6010	Zinc	31.3 F
SW8260B	Volatiles	
SW8270C	Semivolatiles	
TX1005	Total Petroleum Hydrocarbons	

PHGL1145-E3		
Method	Analyte	Result 8.5-11.5'
SW6010B	Total Metals	
SW8260B	Volatiles	
SW8270C	Semivolatiles	
TX1005	Total Petroleum Hydrocarbons	

PHGL1145-E5		
Method	Analyte	Result 8.5-11.5'
SW6010	Chromium, Total	18.6
SW6010	Zinc	31.3
SW8260B	Acetone	0.042
SW8270C	Semivolatiles	
TX1005	Total Petroleum Hydrocarbons	

PHGL1145-N1		
Method	Analyte	Result 8.5-11.5'
SW6010	Zinc	37.8
SW8260B	Acetone	0.14
SW8260B	Ethylbenzene	0.036
SW8260B	m,p-Xylene	0.12
SW8260B	o-Xylene (1,2-Dimethylbenzene)	0.082
SW8260B	Toluene	0.013
SW8270C	2-Methylnaphthalene	1.1
TX1005	Total Petroleum Hydrocarbons	

PHGL1145-W1		
Method	Analyte	Result 7-10'
SW6010	Chromium, Total	18.6
SW6010	Zinc	35.1
SW8260B	Volatiles	
SW8270C	Semivolatiles	
TX1005	Total Petroleum Hydrocarbons	

PHGL1145-W2		
Method	Analyte	Result 8.5-11.5'
SW6010	Chromium, Total	18.9
SW8260B	Volatiles	
SW8270C	Semivolatiles	
TX1005	Total Petroleum Hydrocarbons	

PHGL1145-W3		
Method	Analyte	Result 8.5-11.5'
SW6010B	Total Metals	
SW8260B	Volatiles	
SW8270C	Semivolatiles	
TX1005	Total Petroleum Hydrocarbons	

PHGL1145-S1		
Method	Analyte	Result 8.5-11.5'
SW6010B	Total Metals	
SW8260B	Volatiles	
SW8270C	Semivolatiles	
TX1005	Total Petroleum Hydrocarbons	

Notes
Concentrations reported in mg/kg.
RRS 1—Risk Reduction Standard 1
RRS 2—Risk Reduction Standard 2
F—The analyte was positively identified but the associated numerical
value is below RRS 1
"Blank Spaces"—Analyte not detected above RRS 1

Building 1145

HydroGeoLogic, Inc. - Final Phase II RFI Work Plan
NAS Fort Worth JRB, Texas

Figure 5

Phase II RFI
Proposed Soil Sampling
at AOC 13



U.S. Air Force Center for
Environmental Excellence

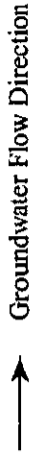
Legend



Fence



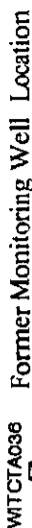
Building / Structure



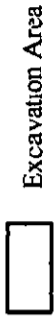
Groundwater Flow Direction



Existing Monitoring Well Location



Former Monitoring Well Location



Excavation Area

Soil Borings

SB114503 Law Engineering - 1994 *

SB114503 IT Corporation - 1997

SB114503 IT Corporation - 1998*

PHGL1145-E1 HGL Confirmation Soil Samples - 2000

BHGLAOC13003 Proposed Delineation Boring

* Survey data are unavailable and
soil boring locations are approximations.

Field Investigations

Law and IT Results 1994-1998

HydroGeoLogic May 2000 Results

HydroGeoLogic Proposed Soil Sampling



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ust 1145-Fig. 4 apr

Project AFC001-16DC

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Revised 12/04/00 of

Map Source HydroGeoLogic, Inc

GIS Database

WITCTA044

Data Screening Values for Inorganic and Organic Compounds in Soil

Method	Analyte	Surface RRS-1	Surface RRS-2	Subsurface RRS-1	Subsurface RRS-2
SW6010	Arsenic	5.85	5.85	6.58	6.58
SW6010	Cadmium	0.556	0.556	0.59	0.59
SW6010	Lead	30.97	30.97	12.66	12.66
SW6010	Zinc	38.8	3100	31.3	3100
SW8270	Bis(2-Ethylhexyl)phthalate	MQL*	0.6		

* MQL is from historical data and was not provided

Method	Analyte	Result
SW6010	Arsenic	6.8
SW6010	Cadmium	9.4
SW6010	Lead	2.7
SW6010	Zinc	3.2

Building 1145

SB114503

Method	Analyte	Result
SW6010	Cadmium	7.9
SW6010	Lead	2.1
SW6010	Zinc	2.0

SB114501

Method	Analyte	Result
SW6010	Cadmium	7.10
SW6010	Lead	18.6

PHGL1145-W1

Method	Analyte	Result
SW6010	Chromium, Total	7.10
SW6010	Chromium, Total	18.6

Method	Analyte	Result
SW6010	Chromium, Total	8.5-11.5
SW6010	Chromium, Total	18.9

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

Method	Analyte	Result
SW6010	Chromium, Total	5.10
SW6010	Chromium, Total	10.15

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SW6010	Chromium, Total	10.15

Notes

- Concentrations reported in mg/kg
- All detections greater than RRS 2 will be submitted for SPLP Analysis
- MQL - Method Quantitation Limit
- RRS 1 - Risk Reduction Standard 1
- RRS 2 - Risk Reduction Standard 2
- F - The analyte was positively identified but the associated numerical value was below the MQL
- J - Estimated quantitative based upon the QC data
- J - The analyte was positively identified but the associated numerical value is the approximate concentration. The value may be lower than the true value
- "Blank Spaces in historical data" - Analyte not detected above RRS 1

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ADMINISTRATIVE RECORD

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